Military Expenditures, Inequality, and Welfare and Political Regimes: A Dynamic Panel Data Analysis

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Abstract

The goal of this paper is to investigate the relationship between type of welfare regimes and military expenditures. There is a sizeable empirical literature on the development of the welfare state and on the typology of the welfare regimes. There appear to be, however, no empirical studies that examine welfare regimes with special attention to military spending. This study aims at providing a comprehensive analysis on the topic by considering several different welfare regime typologies. To do so, we use dynamic panel data analysis for 37 countries for the period of 1988-2003 by considering a wide range of control variables such as type of political regimes, inequality measures, number of terrorist events, and size of the armed forces. Our findings, in line with the literature, show that there is a positive relationship between income inequality and share of military expenditures in the central government budget, and that the number of terrorist events is a significant factor that affects both the level of military expenditure and inequality. Also, the paper reveals a significant negative relationship between social democratic welfare regimes and military expenditures.

Key Words: military spending, welfare regimes, political regimes, income inequality

JEL Classification: C33, D30, H56, I30

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1. Introduction

There is a sizeable empirical literature on the development of the welfare state and on the typology of the welfare regimes, starting from seminal work of Esping-Andersen (1990), which identifies three types of welfare regimes. There appear to be, however, no empirical studies that examine welfare regimes with special attention to military spending. Therefore, the goal of this paper is to investigate the possible relationship between military expenditures, income inequality, and types of welfare and political regimes. To do so, we examine 37 major countries across the world for the period of 1988-2003 in panel data analysis by considering some control variables such as number of terrorist incidents, share of arm imports in total imports, size of the armed forces, real GDP per capita, and GDP growth.

This study is relevant because by utilizing dynamic panel data models, it provides detailed findings to shed light on the complicated nature of relationship between defense spending, income inequality and the type of welfare regimes and political regimes. It is an early attempt to reveal the complicated nature of military expenditures and income inequality for a pseudo-category of welfare regimes (i.e. social democratic, corporatist, liberal, post-communist and productivist) and political regimes. We thus consider the major categories of welfare regimes as well as a recent political regime category in the literature. To the best of our knowledge this study is also the first attempt to compare such a wide range of welfare regimes.

Following this section we provide a brief literature survey on the main typologies of welfare regimes and political regimes, and on the income inequality-military

expenditure relationship. Section 3 introduces data and methodology. Section 4 presents results and discussion. Finally, the last section is reserved to summarize our findings.

2. Literature Survey

Among many definitions based on different approaches, the welfare state in general can be defined as an interventionist state to protect minimum standards of income, nutrition, health, housing, and education for every citizen. The welfare state began to develop in the late nineteenth century in northwestern Europe. Here in this brief literature survey we aim at shedding light on three main issues. First, major typologies of the welfare state are presented. Second, the impacts of defense spending on income inequality are discussed; and, finally, we review the general literature on the political regimes, military expenditures and income inequality.

2.1 Main typologies of welfare regimes

Huber and Stephens (2001) and Amenta and Hicks (2010) review a vast literature that attempts to explain the development of the welfare state based on different theories. This literature includes but is not limited to modernization (Wilensky 1975), class struggle (Stephens 1979; Korpi 1983;1989; Esping-Andersen 1985;1990; Hicks and Swank 1984), political partisanship (Castles 1989), political institutions like states and party systems (Heclo 1974; Orloff 1993a; Weir, Orloff and Skocpol 1988; Skocpol 1988;1992; Pierson 1994), interest groups (Pampel and Williamson 1989), social movements (Amenta et al. 2005), cultural, world-societal influence (Strang and Chang 1993), and gender (Orloff 1993b). Another part of the literature aims to configure welfare regimes, following up the seminal work of Esping-Andersen (1990).

The main typologies of welfare regimes are presented in Table 1 in the Appendix. Based on this literature we constructed our general groups in order to see if there is any basic distinction between these regime types in terms of military expenditures and income inequality. How a government distributes its scarce resources --for example between social and military spending-- is determined by the evolution of its political institutions. In this context, it is relevant to expect different trajectories of military expenditures and income inequality between different welfare regimes, where the degree of decommodification and the kind of stratification are the main determinants of the regimes. That is, one can expect that the guns-and-butter trade-off exists for welfare regimes, whereas more developed (i.e. more generous) regimes are more likely to spend less on military expenditures and are therefore likely to have better income distribution. In this sense we expect that social democratic welfare regimes, who allocate more resources to 'butter,' should spend less on armament and therefore have lower income inequality.

2.2 Military Expenditures and Income Inequality Relationship

The causality between military expenditures and income inequality can be explained from four different approaches (Lin and Ali 2009, p.673). First, the traditional Keynesian theory contends that higher military expenditure leads to higher aggregate demand and employment in the economy. Since this expansion in the economy benefits the poor relatively more it improves income distribution. Second, according to microeconomic theory, since labor in military-related industries is better paid than other sectors, as military expenditures increases, the pay gaps between sectors will rise (Ali 2007, p. 520). Third, since military spending includes both payments for less-skilled

labor and for skilled R&D personnel, their relative shares may have different impacts on the wage discrepancy (Lin and Ali 2009, p. 674). Finally, the welfare states have a constraint in redistributing wealth in the economy. The size of the budget causes governments to decide between different expenditure types. Simply, it can be argued that those that have higher military spending have fewer funds for social expenditures such as education, health, and social transfers. However, there are no consistent results in the literature on the welfare-defense trade-off (Dunne, 2000; Yildirim and Sezgin, 2002).

Compared with studies on the relationships with other macroeconomic variables such as economic growth, unemployment and poverty, the literature on the relationship between military spending and income inequality is very limited (Abell 1994; Seiglie 1997; Ali 2007; 2012; Vadlamannati 2008; Hirnissa et al. 2009; Lin and Ali 2009; Elveren 2012; Kentor et al. 2012). Except for Lin and Ali (2009), where authors argue for no causality between military spending and income inequality, other studies in general find that higher military spending cause higher income inequality in the countries in question.

2.3 Political Regimes-Military Expenditures-Income inequality

In terms of the relationship between political regimes and military expenditures, the empirical literature shows that a guns-and-butter trade-off exists (Hewitt 1992, Sandler and Hartley 1995, Goldsmith 2003, cited by Carter and Palmer 2010). This trade-off is much steeper for non-democratic countries than for democratic countries. Additionally, democratic countries alter their allocations between social and military spending less than autocracies during times of war (see Carter and Palmer 2010 for a theoretical discussion behind the trade-off).

The relationship between political regimes and income inequality has also received attention from scholars (see Kemp-Benedict 2011 for a survey). The literature yields that democracy reduces economic inequality (Reuveny and Li 2003, Chong 2004, Acemoglu and Robinson 2001, Bourguignon and Verdier 2000, and see Hsu 2009 for further discussion). Reviewing the extensive literature on the relationship between democracy and inequality, Gradstein and Milanovic (2000) argues that "while the earlier research failed to detect any significant correlation between democracy and inequality, more recent studies based on improved data sets and bigger data samples typically cautiously suggest existence of a negative relationship between the two" (p. 21, cited in Hsu 2009). Hsu (2009) argues that the major problem in investigating this causal relationship between two is the reliability of measures for inequality. She argues that Deininger and Squire (1996) data set is plagued by sparse data coverage and heterogeneous methods and definitions, which cause unreliable outcomes. Therefore, Hsu (2009) investigates the relationship between political regimes and income inequality by utilizing the UTIP-UNIDO data set, which measures the pay inequality in the manufacturing sector using Theil T Statistics, as a proxy for economic inequality. She establishes an original, categorical data set on regimes for the 1963-2002 period. Hsu shows that the type of political regimes influences economic inequality, but not exactly as the conventional argument suggests. That is, she finds that "communist countries and Islamic republics are more equal than their economic characteristics would predict, while conservative (as distinct from social) democracies are somewhat *less* equal than otherwise expected" (Hsu 2009, p. 1).

3. Data and Methodology

3.1. Data

This study utilizes nine variables in five main categories for 37 countries (see Table 1 and Table 2 in the Appendix[2]), including level of military activities, inequality indicator, economic measures, types of welfare regimes and political regimes.

Military Variables

In order to measure the size of military expenditures we prefer using the share of military expenditures in central government expenditures, MECGE. This data is taken from the United States Department of State's Bureau of Verification and Compliance (BVC). Alternatives to this measure are share of the military expenditures in GDP or GNP. However, since we construct the theoretical model based on the fact that there is a trade-off between different expenditures in the budget, we do not use the share of GDP or GNP[3].

Other variables to measure the military activities are the armed forces per 1000 people (AF) and share of arm imports in total imports (ARMIMP), both of which are provided by BVC. We also consider the number of terror events (TERROR) a possible factor that influences the size of military expenditures. We derive this variable from the Global Terrorism Database (2012).

Inequality Indicators

The inequality indicator, THEIL, is the industrial pay inequality index (UTIP-UNIDO) provided by University of Texas Inequality Project (UTIP). Utilizing Theil T Statistic (Theil 1972) UTIP computes the pay inequality index for 156 countries for the

[2] Initial number of countries was 44 based on our welfare regime categorizations. Nevertheless, as showed in the Table 1 and 2 in the Appendix due to missing values of some variables the number drops to 37.
[3] However, it is worth noting that the results do not change remarkably when the regressions are iterated with the share of military expenditures in GDP or GNP.

1963-2002 period. The same group also calculated the Estimated Household Income Inequality (EHII) by combining UTIP-UNIDO and Deininger-Squire (1996) data sets in the Gini format (please see UTIP (2012) and Galbraith and Kum 2005 for further information about calculation). Although we acknowledge that the manufacturing is a part of overall economic activity, we consider manufacturing pay inequality to be an appropriate indicator of the overall income inequality in line with the detailed discussions in Galbraith and Conceição (2001) and Galbraith and Kum (2005). We replicate[4] our analysis for both data sets since the correlation coefficient between them is 0.753 (Lin and Ali 2009, pp. 677).

Economic Indicators

We use real GDP per capita in 2000 prices, RGDP, and GDP growth, GROWTH provided by BVC.

The Type of Welfare Regimes

There are different welfare regime categorizations based on different methods, assumptions, and theoretical approaches. However, constructing an original category is far beyond the scope of this article. Rather, our pseudo-welfare regime categorization is simply a combination of major welfare regime categorizations that we review in Table 1 in the Appendix. Although we acknowledge that there are some shortcomings of these categorizations in general and of our own simplification in particular, we still argue that this simplification does not prevent us from making some general remarks about the relationship between inequality, military expenditures and welfare regimes. This is primarily because we consider a variety of major welfare regime types in the literature

[4] Since the findings do not change significantly we do not report our results to save space.

that display remarkably different characteristics[5]. Our liberal (LIBERAL) and social-democratic (SOCDEM) welfare regime categories represent the general outcome of all major classifications. For the corporatist (CORPORATIST) regime on the other hand we combine all common countries labeled as corporatist and Southern or Latin Rim countries. We also incorporate Turkey into this group (Gough 1996). We construct a productivist (PRODUCTIVIST) welfare regime based on Holiday (2000), Aspalter (2006), Lee and Ku (2007), and Rudra (2007). Finally, we labeled the last category post-communist (POST-COMM) and include all post-communist European and post-USSR countries based on categorizations of and countries under Fenger (2007) and Whelan and Maitre (2008).

Type of Political Regimes

We use Hsu (2009)'s political regimes classification, namely, social democracy (SDEM), conservative democracy (CDEM), communist (COMM) and civil war (CWAR).

Developed-Developing Countries

We categorize our countries as developed and developing, based on GDP per capita (see Table 2 in the Appendix).

Table 1: Summary of Variables

[5] For instance, although we acknowledge that Spain, Italy, Portugal, Greece and Turkey can be categorized as a distinct group of so-called *Southern*/*Latin Rim* countries, we prefer to categorize them under general corporatist regime since we believe their differences with these regimes (i.e. higher role of family in provision of welfare) are not relevant in our context.

Label	Variables	Source
MECGE	Share of military expenditures as percentage of central government budget	US Department of State's Bureau of Verification and Compliance
THEIL	UTIP-UNIDO industrial pay inequality index	University of Texas Inequality Project
EHII	Estimated Household Income Inequality	University of Texas Inequality Project
AF	Armed forces per 1000 people	US Department of State's Bureau of Verification and Compliance
ARMIMP	Arm imports as a percentage of total imports	US Department of State's Bureau of Verification and Compliance
TERROR	Number of terrorist incidents	Global Terrorism Data Base
RGDP	Reel Gross Domestic Products per capita in 2000 prices	US Department of State's Bureau of Verification and Compliance
GROWTH	GDP growth rate	US Department of State's Bureau of Verification and Compliance
DEVELOPED (dummy)		See Table 2 in the Appendix
Type of Welfare Regimes (dummies)		See Table 1 in the Appendix
Type of Political Regimes (dummies)		Hsu, Sara. (2009) "The Effect of Political Regimes on Inequality, 1963-2002" UNRISD Flagship Report: Combating Poverty and Inequality.

3.2 Empirical Strategy

We use a dynamic panel method in order to analyse the relationship between military expenditures, income inequality and welfare and political regimes.

In the context of our empirical approach, we employ a dynamic specification in order to account for the occurrence of significant lagged effects of the dependent variable which determine serial correlation in the dependent variable. Regression specification for dynamic panel structure is as follows:

$$MECGE_{it} = \alpha + \beta_1 MECGE_{it-1} + \beta_2 MECGE_{it-2} + \gamma' X_{it} + \varepsilon_i + \eta_t + u_{it} \quad (1)$$

where the subscripts i and t denote countries and years, respectively.

Dependent variable is the share of military expenditures as a percentage of central government budget ($MECGE_{it}$). The right hand side includes first and second lag values of $MECGE_{it}$. X_{it} is the set of explanatory variables including UTIP-UNIDO industrial pay inequality index (THEIL), armed forces per 1000 people (AF), arm imports as a percentage of total imports (ARMIMP), number of terrorist incidents (TERROR), real gross domestic products per capita (RGDP), GDP growth (GROWTH). X_{it} also includes several dummies for welfare regimes (social-democratic, liberal, corporatist, productivist, post-communist), political regimes (social democracy, conservative democracy, communist, civil war), and developed countries in some regressions. ε_i are the unobserved country specific fixed-effects, η_t are year dummies, and finally u_{it} are the indentically and independently distributed error terms.

Estimating equation (1) with Ordinary Least Square (OLS) method in a lack of a panel setting can be promlematic. First of all, OLS ignores the individual fixed effects for countries. Some serial correlation problems may arise in dynamic OLS regressions. Also, some regressors may be endogeneous.

In order to control for individual fixed effects (ε_i), we can write equation (1) in differences. The first differencing specification is thus as follows:

$$\Delta MECGE_{it} = \alpha + \beta_1 \Delta MECGE_{it-1} + \beta_2 \Delta MECGE_{it-2} + \gamma' \Delta X_{it} + \eta_t + \Delta u_{it} \qquad (2)$$

where Δ is the first difference operator.

First differencing removes any potential bias that could be sourced from fixed country-specific effect (unobserved heterogeneity). To control the endogeneity problem, Arellano and Bond (1991) proposed using a Generalized Method of Moment (GMM) estimation, in which the use of lagged levels of the regressors as instruments for the first-

differenced regressors (difference GMM). That is, difference GMM uses historical (lagged) values of regressors for current changes in these variables.

However, the difference GMM estimator is weak or the regressors may be poor instruments if cross-section variability dominates time variability and if there is a strong persistence in the examined time series (Bond et al., 2001). To solve this problem, Arellano and Bover (1995), and Blundell and Bond (1998) recommend an augmented version of difference GMM. The system GMM estimator takes into account both equations; a set of first-differenced equations with equations in levels as a system. System GMM employs different instruments for each estimated equation simultaneously. Particularly, this method comprises the use of lagged levels of the regressors as instruments for the difference equation and the use of lagged first-differences of the regressors as instruments for the levels equation. Moreover, system GMM allows to control for the dynamics of adjustment by including a lagged endogenous variable among the exogenous variables. Therefore, system GMM implies an efficiency gain by using additional instruments.

System GMM is widely used for the empirical models in the literature, which allows few time periods and many individuals, i.e. small T, large N; some endogenous variables; and fixed effects. Also GMM considers heteroskedasticity and autocorrelation (Roodman, 2009).

4. Results and Discussion

We employ System GMM analysis based on an unbalanced data set, in order to investigate the relationship between military expenditures and inequality in the context of different political and welfare regimes[6].

Our dynamic panel approach uses System-GMM based on Roodman[7] (2006) and Roodman (2009). We used an AR(1) and an AR(2) model to capture the persistence in our data. In addition, AR(1) and AR (2) models are desirable based on the Arellano-Bond test for AR(2). To consider any cross sectional dependence we included time dummies as instruments in some regressions. Since there may be an endogeneity problem for most of our explanatory variables, we set THEIL, AF, ARMIMP, RGDP, GROWTH, and first and second lags of the dependent variable (MECGE) as endogenous. In order to avoid overidentification we used the collapse option, hence the GMM instrument is constructed by creating one instrument for each variable and lag distance (rather than one for each time period, variable, and lag distance). The other independent variables are instrumented as suggested by Roodman (2009). In other words, the other explanatory variables are treated as typical instrumental variables instead of GMM because they are assumed to be exogenous. All estimations were conducted with two-step efficient GMM to fix any non-spherical errors, and small sample corrections (Windmeijer-corrected standard errors) to the covariance matrix estimate (Windmeijer, 2005).

The estimated models pass the specification tests. According to Arellano-Bond test statistics for AR(1) and AR(2), the consistency of the GMM estimators is verified, as there is no evidence of a second-order serial correlation in the differenced residuals of the

[6] All regressions are repeated for the case where income inequality is dependent variable. To save space those results are not reported.
[7] Roodman (2006) develops 'the xtabond2' command for use with STATA.

models. The Hansen test statistics approve the validity of the GMM instruments. Finally, the Difference-Hansen test statistics provide no evidence to reject the null hypothesis of the validity of the additional moment conditions used in the system GMM estimations.

Table 2 provides descriptive statistics of variables categorized by welfare regimes. The table shows that the social democratic welfare regime, which we take as a base category in our analysis, has the lowest inequality, number of terrorist incidents, and military expenditures, and the highest real GDP per capita[8]. Productivist welfare regimes have the highest military expenditure as a share of government budget, greatest inequality, largest armed forces, and the most growth.

Table 2: Summary statistics of the variables according to the welfare regimes

Variables	*Welfare Regimes*	*Mean*	*St. Dev.*	*Min*	*Max*
MECGE	corporatist	5.69	3.584	1.5	20.3
	liberal	8	5.301	1.8	25.5
	postcomm	7.457	6.07	1.3	35.4
	productivist	16.92	9.146	4.2	36.6
	social democrat	4.935	0.833	3.6	7
	Overall	8.054	6.669	1	36.6
THEIL	Corporatist	0.028	0.0186	0.0085	0.09
	Liberal	0.0286	0.0233	0.0114	0.134
	Postcomm	0.0303	0.0213	0.0038	0.093
	Productivist	0.0327	0.018	0.0064	0.08
	social democrat	0.0074	0.0026	0.0028	0.01
	Overall	0.0275	0.0204	0.0028	0.134
AF	Corporatist	6.908	4.315	2.3	20.5
	Liberal	3.743	1.489	1.9	9.1
	Postcom	5.977	3.404	1	21.9
	Productivist	10.15	6.62	1.9	21.2
	social democrat	6.312	1.724	3.7	12
	Overall	6.532	4.349	1	21.9
ARMIMP	Corporatist	1.182	1.813	0	8.6
	Liberal	0.906	0.953	0	4.5

[8] It is also worth noting that correlation between 'total world military spending' and 'reel military expenditure per capita' is the lowest for social democratic welfare regime (as well as social democracy political regime), which implying that neighborhood effects (i.e. arms races) is lower compared with other groups of countries (see Table 3 in the Appendix). This finding also indirectly supports the general findings of the paper that social democratic welfare regimes are likely to spend less on military expenditures compared to other welfare regimes.

	Postcomm	0.711	1.502	0	14.3
	Productivist	1.164	1.09	0.1	8.1
	social democrat	0.938	0.73	0.2	3.4
	Overall	0.966	1.434	0	14.3
RGDP	Corporatist	19.62	9.887	3.211	51.98
	Liberal	21.53	6.643	10.93	37.7
	Postcomm	2.839	1.769	0.346	6.775
	Productivist	15.75	12.5	0.373	38.97
	social democrat	26.99	5.614	17.65	40.62
	overall	14.59	11.63	0.346	51.98
GROWTH	corporatist	2.766	2.333	-5.7	9.8
	liberal	3.549	2.36	-2.09	11.46
	postcomm	0.408	8.465	-44.9	12.1
	productivist	5.986	4.184	-7.36	14.2
	social democrat	2.387	2.158	-6	6.21
	overall	2.555	5.624	-44.9	14.2
TERROR	corporatist	23.64	54.6	0	515
	liberal	10.36	16.12	0	76
	postcomm	5.762	16.93	0	117
	productivist	4.256	11.44	0	92
	social democrat	0.985	2.041	0	12
	overall	10.873	32.834	0	515

Table 3 provides System GMM estimation results. All variables, except for RGDP, are significant, most at the 1 % level. Dynamic panel analyses' findings in the table show that lagged values of military expenditures have a positive effect on their present value. The results show that as inequality (THEIL), the size of armed forces (AF) and number of terror occurrences (TERROR) increase military expenditures as a percentage of government expenditures (MECGE) increase as well (Model 1.1). On the other hand, arm imports as a percentage of total imports (ARMIMP) and real GDP per capita (RGDP) have negative relationships with military expenditure. These relationships are also valid when year dummies are added (Model 1.2).

While the explanation for the positive relationship between income inequality, armed forces, terror, and share of military expenditure in the central government budget is more straightforward, the impact of the share of arms imports in total imports and real

GDP per capita deserves more attention. Regarding arms imports to total imports, the ratio can increase either if arms imports increase (more than the increase in total imports) or total imports decrease (more than the decrease in arms imports). Considering its comparative advantage in trade, it could be the case that the country can obtain armaments at relatively lower cost by importing rather than producing them domestically. Therefore, the country spends less on armaments as a share of budget. Regarding real GDP per capita, it can be argued that as the country becomes affluent, greater democracy causes lower military expenditures as the theoretical and empirical studies suggest (Carter and Palmer 2010). Or, as the economy develops, the share of military expenditures shrinks as the total government budget expands. However, it is of importance to note that except for the first two base models, RGDP is not a statistically significant variable in the context of welfare and political regimes.

Table 3: System GMM Estimation Results-1

VARIABLES	(1.1)	(1.2)	(1.3)	(1.4)	(1.5)	(1.6)	(1.7)	(1.8)	(1.9)	(1.10)
Lag (MECGE)	0.2677*** (0.005)	0.2345*** (0.007)	0.2653*** (0.005)	0.2316*** (0.007)	0.3984*** (0.011)	0.3442*** (0.011)	0.2329*** (0.005)	0.2160*** (0.007)	0.2263*** (0.011)	0.2554*** (0.012)
Second Lag (MECGE)	0.1869*** (0.010)	0.2379*** (0.012)	0.1935*** (0.011)	0.2433*** (0.012)	0.1650*** (0.011)	0.2125*** (0.014)	0.2547*** (0.013)	0.2670*** (0.013)	0.1420*** (0.014)	0.1586*** (0.013)
THEIL	23.1364*** (3.554)	24.1508*** (3.401)	24.7034*** (4.226)	24.2262*** (4.576)	23.1586*** (5.730)	26.5776*** (4.615)	23.7152*** (4.381)	21.1558*** (3.614)	4.4751 (9.769)	16.8963** (7.540)
AF	0.1229*** (0.036)	0.2401*** (0.037)	0.1793*** (0.051)	0.2602*** (0.043)	0.1722*** (0.058)	0.2483*** (0.049)	0.2153*** (0.047)	0.2868*** (0.030)	0.1198*** (0.039)	0.1770** (0.073)
ARMIMP	-0.3990*** (0.036)	-0.1694** (0.072)	-0.3208*** (0.062)	-0.1482* (0.074)	0.0267 (0.062)	0.2403*** (0.076)	-0.2910*** (0.072)	-0.1591** (0.077)	-0.7709*** (0.063)	-0.2421** (0.107)
RGDP	-0.0563*** (0.013)	-0.0490*** (0.015)	-0.0300 (0.021)	-0.0206 (0.022)	-0.0238 (0.029)	-0.0344 (0.031)	-0.0099 (0.020)	-0.0233 (0.018)	0.0034 (0.019)	-0.0042 (0.029)
TERROR	0.0194*** (0.001)	0.0154*** (0.002)	0.0176*** (0.002)	0.0165*** (0.002)	0.0162*** (0.003)	0.0082** (0.004)	0.0154*** (0.002)	0.0150*** (0.002)	0.0311*** (0.002)	0.0178*** (0.003)
Welfare regimes										
CORPORATIST					-0.9355*** (0.317)	-0.8931** (0.345)				
LIBERAL					1.0408*** (0.349)	1.0073* (0.524)				
POST-COMM					-0.6211 (0.475)	-0.9177 (0.662)				
PRODUCTIVIST					3.0428*** (0.357)	2.8737*** (0.520)				
SOCDEM			-0.4358 (0.294)	-0.7340** (0.277)						
Political regimes										
SDEM							-1.1696*** (0.260)	-1.3795*** (0.308)		
CDEM									1.7575** (0.729)	1.7005*** (0.482)
COMM									12.6726*** (2.468)	13.1071*** (1.552)
CWAR									11.8363*** (0.788)	8.9216*** (0.992)
Constant	3.6011*** (0.597)	2.5172*** (0.554)	2.7142*** (0.856)	1.9467** (0.728)	1.3899 (1.051)	1.0267 (1.086)	2.1157** (0.848)	2.1306*** (0.549)	2.4244*** (0.649)	1.1203 (0.966)

Observations	303	303	303	303	303	303	302	302	302	302
Number of countries	37	37	37	37	37	37	37	37	37	37
Year dummies as instruments	**no**	**yes**	**no**	**yes**	**no**	**yes**	**no**	**yes**	**no**	**yes**
F-statistic	20250.37	5028.48	5335.52	2453.85	1870.76	1962.46	18943.60	2052.53	47472.72	2946.09
p value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(1)	-1.15	-1.08	-1.09	-1.06	-1.20	-1.07	-1.02	-1.05	-1.32	-1.12
p value	0.250	0.280	0.277	0.289	0.230	0.283	0.306	0292	0.187	0.263
Arellano-Bond test for AR(2)	-0.95	-1.00	-1.01	-1.00	-0.98	-1.09	-1.05	-1.02	-0.90	-1.02
p value	0.340	0.316	0.312	0.319	0.329	0.277	0.295	0307	0.369	0.306
Hansen test for over identification (p-value)	0.441	0.899	0.546	0.924	0.777	0.999	0.618	0.934	0.501	0.941
Diff-in-Hansen Tests for Exogeneity of GMM Instruments (p value)	0.551	0.673	0.564	0.743	0.640	0.957	0.563	0786	0.567	0.810

All estimations were conducted with two-step efficient GMM and small sample corrections to the covariance matrix estimate.
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.10.

As another exercise, we attempt to examine the effect of being in a social democratic welfare regime, our base regime type, since it is the most developed (i.e. generous/advanced) welfare system. Similarly, inequality, armed forces and terror are also statistically significant variables in explaining the share of military expenditures. Being in a social democratic welfare state decreases the share of the military expenditures when the year dummy is added (Model 1.4). When we compare other welfare regime types with the social democratic one (Model 1.5 and 1.6), we find that while liberal or productivist welfare regime are likely to have higher military expenditures, corporatist or post-communist tend to spend less on armament.

In the same manner we repeat the analyses for political regimes. The results show that, being a social democracy political regime reduces military expenditures significantly regardless of year dummies (Model 1.7 and 1.8). Compared to social democracy, being a communist, civil war, or conservative democracy tend to spend more on the military as a share of central government expenditures. These results are unchanged when we consider year dummies (Model 1.9 and 1.10).

Table 4 present the results of a similar analysis, where GDP growth (GROWTH) replaces real GDP per capita (RGDP). This is of importance because real GDP per capita does not necessarily yield the same results as GDP growth. As a matter of fact, Table 4 shows that, opposite to real GDP, which is not significant except in the first two models, growth has a positive (i.e. increasing) and statistically significant impact on military expenditure as a share of central budget government in each model. Another change in results is observed in Models 2.5 and 2.6, which suggest that compared to social democratic welfare regimes, post-communist welfare regime countries are likely to spend

more on military expenditures.

Our final set of estimations aims at analyzing being a developed country (determined in terms of GDP per capita), regardless of welfare regime or political regime category[9].

The general findings of the study can be summarized as follows. First, the positive relationship between income inequality, represented by Theil inequality index, and the share of military expenditures observed, in both cases where both variables are dependent, supports the early findings of Ali (2007)-- that as military expenditure increases inequality increases.

Second, there is a statistically significant negative relationship between military expenditures and both social democratic welfare regime and social democracy political regime for each model and method we employed in the study. This is a new finding in the immense literature on the welfare regimes. Considering the finding in the literature that higher military spending is associated with higher income inequality, our finding that, compared to other regimes the share of military expenditures in social democratic welfare regimes is lower, is also consistent with the other core findings of the literature that higher democracy improves income distribution.

Third, our findings also confirm and support Ali's (2007) findings that terror is a significant factor that affects both the level of military expenditure and inequality.

Fourth, our findings raise a major issue/question about why governments of developing countries have higher shares of military expenditures than developed

[9] Here we would like to see if there is a significant differences between developed and developing countries in terms of military expenditure. Table 4 in the Appendix shows that developed countries have a lower share of military expenditures in budgetary spending compared to developing ones.

economies. Although the answer to this question is beyond the scope of this study, the correlation coefficients between military expenditures of each group of welfare regimes and total world military expenditures still provides a modest indication that one possible factor is due to arms races, in which developing countries are more likely to follow the world armament trend than developed countries. Another possible explanation is that since overall budgets of developing countries are small, the share of military expenditures is high. That means there is a "subsistence level" of military spending that each country has to bear, which is not insignificant compared to total spending.

Table 4: System GMM Estimation Results-2

VARIABLES	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(2.6)	(2.7)	(2.8)	(2.9)	(2.10)
Lag (MECGE)	0.3449*** (0.003)	0.3230*** (0.012)	0.3480*** (0.006)	0.3224*** (0.010)	0.4532*** (0.011)	0.3813*** (0.010)	0.3100*** (0.002)	0.2973*** (0.009)	0.2518*** (0.010)	0.2961*** (0.015)
Second Lag (MECGE)	0.1403*** (0.005)	0.1778*** (0.007)	0.1324*** (0.005)	0.1732*** (0.007)	0.0899*** (0.010)	0.1445*** (0.010)	0.1904*** (0.006)	0.2006*** (0.009)	0.1179*** (0.016)	0.1263*** (0.012)
THEIL	16.9868*** (5.079)	21.6873*** (4.803)	26.2099*** (7.411)	9.8916** (3.779)	23.5070** (9.309)	-0.5038 (5.539)	10.8273* (5.862)	10.3765** (4.885)	-3.9153 (8.137)	11.8463 (7.219)
AF	0.1604*** (0.030)	0.2228*** (0.049)	0.1871*** (0.034)	0.1533*** (0.036)	0.1755*** (0.032)	0.1952*** (0.043)	0.1624*** (0.021)	0.2063*** (0.038)	0.1112** (0.042)	0.1635*** (0.043)
ARMIMP	-0.3035*** (0.041)	-0.2921*** (0.036)	-0.2351*** (0.048)	-0.3399*** (0.031)	0.2423*** (0.061)	-0.1119** (0.051)	-0.3416*** (0.041)	-0.3475*** (0.045)	-0.6527*** (0.053)	-0.2919*** (0.088)
GROWTH	0.1155*** (0.004)	0.0737*** (0.004)	0.1107*** (0.004)	0.0702*** (0.005)	0.1564*** (0.006)	0.1101*** (0.005)	0.0885*** (0.004)	0.0573*** (0.005)	0.0901*** (0.006)	0.0958*** (0.005)
TERROR	0.0201*** (0.001)	0.0182*** (0.001)	0.0185*** (0.001)	0.0190*** (0.001)	0.0148*** (0.003)	0.0244*** (0.003)	0.0188*** (0.001)	0.0182*** (0.001)	0.0302*** (0.001)	0.0218*** (0.002)
Welfare regimes										
CORPORATIST					-0.7096*** (0.246)	-0.8602 (1.346)				
LIBERAL					1.1942** (0.470)	1.7518** (0.692)				
POST-COMM					0.6153 (0.365)	0.9618 (1.010)				
PRODUCTIVIST					3.9447*** (0.581)	4.0985*** (1.162)				
SOCDEM			-0.6855*** (0.240)	-1.3150 (2.095)						
Political regimes										
SDEM							-1.7027*** (0.320)	-1.9609*** (0.171)		
CDEM									2.1520*** (0.460)	1.7565*** (0.447)

COMM									12.8613*** (1.331)	12.1285*** (1.813)
CWAR									12.5812*** (0.746)	10.5817*** (0.813)
Constant	2.0266*** (0.291)	1.4084*** (0.353)	1.6022*** (0.462)	2.4067*** (0.333)	0.0383 (0.381)	0.9694 (0.878)	2.5428*** (0.343)	2.4308*** (0.335)	2.1024*** (0.302)	0.8986** (0.402)
Observations	303	303	303	303	303	303	302	302	302	302
Number of countries	37	37	37	37	37	37	37	37	37	37
Year dummies as instruments	**no**	**yes**	**no**	**yes**	**no**	**yes**	**no**	**yes**	**no**	**yes**
F-statistic	19568.80	23014.81	15868.29	13202.41	33965.21	21492.60	31336.95	6984.68	13742.21	5321.17
p value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(1)	-1.20	-1.17	-1.26	-1.18	-1.31	-1.27	-1.14	-1.14	-1.33	-1.30
p value	0.231	0.244	0.209	0.238	0.190	0.206	0.254	0.254	0.183	0.195
Arellano-Bond test for AR(2)	-0.96	-0.96	-0.90	-0.97	-0.86	-0.93	-0.98	-0.98	-0.88	-0.88
p value	0.338	0.339	0.370	0.334	0.388	0.352	0.325	0.328	0.381	0.377
Hansen test for over identification (p-value)	0.623	0.984	0.881	0.935	0.979	0.980	0.646	0.979	0.676	0.988
Diff-in-Hansen Tests for Exogeneity of GMM Instruments (p value)	0.263	0.737	0.434	0.803	0.691	0.969	0.425	0.790	0.467	0.866

All estimations were conducted with two-step efficient GMM and small sample corrections to the covariance matrix estimate.
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.10.

5. Conclusion

The aim of this paper was to investigate the possible relationship between military expenditures, income inequality, and type of welfare regimes and political regimes. Although the literature on the development of welfare regimes is immense, there is less work on the relationship between military expenditures and income inequality, and, to the best of our knowledge there is no work that directly addresses the relationship between military spending and inequality in the context of different welfare regimes. We also incorporated recent data on types of political regimes to capture possible changes in this linkage. To investigate this relationship we examined 37 major countries across the world for the period of 1988-2003 in a panel data analysis by considering some important variables such as number of terrorist incidents and the size of the armed forces.

This study is relevant because by utilizing the methods for dynamic panel data models, it provides detailed findings to shed light on the complicated nature of the relationship between defense spending, income inequality and type of welfare regimes and political regimes. Our results confirm and support the earlier findings in the literature. The findings that there is a positive relationship between income inequality and share of military expenditures, and that terror is a statistically significant factor that affects both the level of military expenditure and inequality, are in line with the literature. Our findings also contribute to the literature by presenting a statistically significant relationship between social democratic welfare and social democratic political regimes and military expenditures.

The study shows that other welfare regimes, except for corporatist, compared to social democratic welfare regime and developing countries compared to developed ones

are more likely to have higher shares of military expenditures in the central government budget, which supports the finding that higher democracy is associated with less inequality and military expenditures.

Lack of a more comprehensive data set that prevents us from examining a longer time period was the main constraint of the study. For further studies in future, availability of data for more countries and/or for longer time periods would allow one to investigate the relationship in question for various and perhaps larger number of welfare regime types. However, even though we acknowledge this shortcoming due to unavailability of data sets, we still believe that our early findings present some important findings for the complicated nexus of military-inequality-welfare/political regimes.

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Appendix

Table 1: Major Welfare Regime Categories

Esping-Andersen (1990)	**Liberal**	**Conservative**	**Social-democratic**			
	Australia	Italy	Austria			
	Canada	Japan	Belgium			
	USA	France	Netherlands			
	New Zealand	Germany	Denmark			
	Ireland	Finland	Norway			
	UK	Switzerland	Sweden			
Leibfried (1992)	**Anglo-Saxon**	**Bismarck**	**Scandinavian**	**Latin Rim**		
	USA	Germany	Sweden	Spain		
	Australia	Austria	Norway	Portugal		
	New Zealand		Denmark	Greece		
	UK		Finland	Italy		
				France		
Castles & Mitchell	**Liberal**	**Conservative**	**Non-right hegemony**	**Radical**		

(1993)						
	Ireland	West-Germany	Belgium	Australia		
	Japan	Italy	Denmark	New Zealand		
	Switzerland	Netherlands	Norway	UK		
	United States		Sweden			
Siaroff (1994)	**Protestant Liberal**	**Advanced Christian Democratic**	**Protestant Social Democratic**	**Late Female Mobilization**		
	Australia	Austria	Denmark	Greece		
	Canada	Belgium	Finland	Ireland		
	New Zealand	France	Norway	Italy		
	UK	West-Germany	Sweden	Spain		
	USA	Luxembourg		Japan		
		Netherlands		Portugal		
				Switzerland		
Ferrera (1996)	**Anglo-Saxon**	**Bismarckian**	**Scandinavian**	**Southern**		
	UK	Germany	Sweden	Italy		
	Ireland	France	Denmark	Spain		
		Belgium	Norway	Portugal		
		Netherlands	Finland	Greece		
		Luxembourg				
		Austria				
		Switzerland				
Bonoli (1997)	**British**	**Continental**	**Nordic**	**Southern**		
	UK	Netherlands	Sweden	Italy		
	Ireland	France	Norway	Switzerland		
		Belgium	Denmark	Spain		
		Germany	Finland	Greece		
		Luxembourg		Portugal		
Kopri & Palme (1998)	**Basic Security**	**Corporatist**	**Encompassing**	**Targeted**		
	Canada	Austria	Finland	Australia		
	Denmark	Belgium	Norway			
	Netherlands	France	Sweden			
	New Zealand	Germany				
	Switzerland	Italy				
	Ireland	Japan				
	UK					
	USA					
Huber & Stephens (2001)	**Social Democratic**	**Christian democratic**	**Liberal**	**Wage Earner**		
	Sweden	Austria	Canada	Australia		
	Norway	Belgium	Ireland	New Zealand		
	Denmark	Netherlands	UK	Japan		
	Finland	Germany	USA			
		France				
		Italy				

		Switzerland				
Powell and Barrientos (2004)	**Social democratic**	**Conservative**	**Liberal**			
	Finland	Italy	Australia			
	Denmark	Portugal	Ireland			
	Sweden	Greece	USA			
	Norway	Spain	UK			
	France	Germany	Switzerland			
	Netherlands	New Zealand	Canada			
		Belgium	Japan			
		Austria				
Aspalter (2006)	**Social Democratic**	**Corporatist/ Christian Democratic**	**Liberal**	**Conservative**		
	Sweden	Germany	USA	Japan		
	Norway	Austria	Canada	South Korea		
	Finland	France	Australia	China		
	Denmark	Belgium	New Zealand	Hong Kong		
		Italy	UK	Taiwan		
		Spain		Malaysia		
				Singapore		
Fenger (2007)	**Conservative-Corporatist**	**Social-Democratic**	**Liberal**	**Former-USSR**	**Post-communist European**	**Developing welfare state**
	Austria	Sweden	New Zealand	Belarus	Bulgaria	Georgia
	Belgium	Norway	UK	Estonia	Croatia	Romania
	France	Finland	USA	Latvia	Czech Rep.	Moldova
	Germany	Denmark		Lithuania	Hungary	
	Greece			Russia	Poland	
	Italy			Ukraine	Slovakia	
	Netherlands					
	Spain					
Whelan and Maitre (2008)	**Social democratic**	**Corporatist**	**Liberal**	**Southern**	**Corporatist post-socialist**	**Liberal post-socialist**
	Sweden	Germany	UK	Cyprus	Czech	Estonia
	Denmark	Austria	Ireland	Greece	Hungary	Latvia
	Iceland	Belgium		Italy	Poland	Lithuania
	Finland	France		Portugal	Slovenia	
	Norway	Luxembourg		Spain	Slovakia	
	Netherlands					
Holiday (2000)	**Productivist**					
	Japan					
	Hong Kong					
	Singapore					
	South Korea					
	Taiwan					
Lee and Ku (2007)	**Productivist (developmental)**					

	South Korea					
	Taiwan					
	Japan					
Rudra (2007)	Same cluster					
	South Korea					
	Malaysia					
	Singapore					
	Thailand					
Our pseudo-classification	**Liberal**	**Corporatist**	**Social-democratic**	**Productivist**	**Post-Communist**	
	Australia	Austria	Denmark	Japan	Belarus*	
	Canada	Belgium	Finland	South Korea	Estonia*	
	Ireland	France	Norway	Hong Kong*	Latvia	
	New Zealand	Germany	Sweden	Taiwan*	Lithuania*	
	UK	Greece		Malaysia	Russia	
	USA	Italy		Singapore	Ukraine	
		Luxembourg		China	Bulgaria	
		Netherlands			Croatia	
		Portugal			Czech Rep.	
		Spain			Hungary	
		Switzerland*			Poland	
		Turkey			Slovakia	
					Romania	
					Moldova	
					Georgia*	

Source: Arts and Gelissen (2002) and authors' review (*) Not included in the analysis due to missing data of some variables.

Table 2: Developed countries classification

Australia	developed		Greece	developed		Portugal	developed
Austria	developed		Hong Kong*	developed		Romania	not developed
Belarus*	not developed		Hungary	not developed		Russia	developed
Belgium	developed		Ireland	developed		Singapore	developed
Bulgaria	not developed		Italy	developed		Slovakia	not developed
Canada	developed		Japan	developed		South Korea	developed
China	not developed		Latvia	not developed		Spain	developed
Croatia	not developed		Lithuania*	not developed		Sweden	developed
Czech Rep.	not developed		Luxembourg	developed		Switzerland*	developed
Denmark	developed		Malaysia	not developed		Taiwan*	not developed
-Estonia*	not developed		Moldova	not developed		Turkey	not developed
Finland	developed		Netherlands	developed		Ukraine	not developed
France	developed		New Zealand	developed		UK	developed
Georgia*	not developed		Norway	developed		USA	developed
Germany	developed		Poland	not developed			

* Not included in the analysis due to missing data of some variables. This classification is based on World Bank (2012), in which we categorize high income and upper middle countries as developed.

Table 3: Correlation coefficients between "total world military expenditure" and "real military expenditure per capita (1999 price)"

Welfare regimes	
Social democratic	0.0381
Corporatist	0.1002
Liberal	0.1022
Post-communist	0.3063
Productivist	-0.0791
Political regimes	
Social democracy	0.1004
Conservative democracy	0.1060
Communist	0.6155
Civil war	-0.9104

Table 4: System-GMM Estimation Results-3

VARIABLES	(3.1)	(3.2)	(3.3)	(3.4)	(3.5)	(3.6)	(3.7)	(3.8)
Lag (MECGE)	0.2785*** (0.018)	0.1981*** (0.009)	0.2403*** (0.009)	0.2002*** (0.010)	0.6047*** (0.010)	0.6141*** (0.006)	0.6405*** (0.010)	0.6112*** (0.007)
Second Lag (MECGE)	-0.0870*** (0.014)	0.2234*** (0.013)	0.1198*** (0.014)	0.2242*** (0.013)	0.1262*** (0.011)	0.1530*** (0.006)	0.1170*** (0.010)	0.1554*** (0.006)
THEIL	-15.4311** (6.159)	14.0984*** (3.090)	13.3523** (6.114)	12.7468*** (2.898)	32.8832*** (5.759)	9.4798*** (1.246)	29.6951*** (3.810)	9.3929*** (1.074)
AF	-0.0855 (0.070)	0.2337*** (0.019)	-0.0701 (0.055)	0.2388*** (0.024)	0.0985*** (0.026)	-0.0113 (0.022)	0.0768** (0.029)	-0.0182 (0.023)
ARMIMP	-0.3115*** (0.062)	-0.5274*** (0.045)	-0.5229*** (0.069)	-0.5466*** (0.041)	0.3134*** (0.055)	0.0248 (0.024)	0.2826*** (0.045)	0.0256 (0.024)
GROWTH					0.0726*** (0.009)	0.0221*** (0.004)	0.0567*** (0.007)	0.0237*** (0.004)
TERROR	0.0336*** (0.003)	0.0228*** (0.001)	0.0301*** (0.001)	0.0228*** (0.001)	0.0046*** (0.001)	0.0102*** (0.000)	0.0045*** (0.001)	0.0102*** (0.000)
DEVELOPED	-17.7102*** (2.257)	-1.7835*** (0.384)	-2.7505*** (0.429)	-2.1627*** (0.174)	0.0287 (0.213)	-0.9563*** (0.149)	-0.3052** (0.117)	-0.8982*** (0.088)
Constant	18.8451*** (1.277)	3.6724*** (0.368)	6.7521*** (0.616)	3.9334*** (0.237)	-0.2968 (0.370)	1.7873*** (0.210)	0.0874 (0.314)	1.7726*** (0.181)
Observations	314	314	314	314	303	303	303	303
Number of countries	39	39	39	39	37	37	37	37
Year dummies as instruments	**no**	**yes**	**no**	**yes**	**no**	**yes**	**no**	**yes**
F-statistic	402.06	1310.09	638.48	4640.01	3295.17	22841.59	3525.78	5689.04
p value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Arellano-Bond test for AR(1)	-1.56	-1.09	-1.22	-1.10	-1.28	-1.33	-1.32	-1.32
p value	0.119	0.277	0.224	0.269	0.199	0.185	0.186	0.186
Arellano-Bond test for AR(2)	-0.41	-1.00	-0.88	-1.00	-0.89	-0.91	-0.88	-0.91
p value	0.684	0.318	0.381	0.319	0.375	0.364	0.379	0.361
Hansen test for over identification (p-value)	0.686	0.530	0.296	0.591	0.581	0.870	0.591	0.887
Diff-in-Hansen Tests for Exogeneity of GMM Instruments (p value)	0.504	0.336	0.612	0.390	0.687	0.528	0.712	0.647

All estimations were conducted with two-step efficient GMM and small sample corrections to the covariance matrix estimate.
Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.10.